

CLAIM AMENDMENTS

1. (Currently amended) A system for load balancing, the system comprising:
a contact L2TP Network Server (LNS) that can determine whether to establish a session between the contact LNS and an L2TP Access Concentrator (LAC), the contact LNS being communicatively coupled to the LAC;
~~the LAC, an L2TP Access Concentrator (LAC), the LAC including a contact L2TP Network Server (LNS)~~an address of the contact LNS, the LAC using the address of the contact LNS to send to the contact LNS at least a first message to request establishment of the session between the contact LNS and the LAC and to inform the contact LNS of the availability of the LAC for participating in load balancing; and~~[[, ;]]~~
~~a contact LNS communicatively coupled to the LAC; and~~
~~a plurality of load balancing LNSs communicatively coupled to the contact LNS and to the LAC,~~
~~wherein the contact LNS address specifies the address of the contact LNS,~~
~~wherein the LAC sends a message to the contact LNS, the message informing the contact LNS of the availability of the LAC for participating in load balancing,~~
~~wherein the contact LNS determines whether the contact LNS can handle a session between the contact LNS and the LAC,~~
~~wherein if the contact LNS determines the contact LNS can handle~~establishing the requested session, the contact LNS establishes the requested session with the LAC, and
~~wherein if the contact LNS determines the contact LNS cannot handle~~establishing the requested session, the contact LNS sends to the LAC a response message containing an Internet

Protocol (IP) address of a selected load balancing LNS ~~one~~ of the plurality of load balancing LNSs to which the LAC should establish a session.

2. (Original) The system of claim 1 wherein the contact LNS is included within a virtual LNS.

3. (Currently amended) The system of claim 1, wherein the at least a first message to request establishment of the session between the contact LNS and the LAC and to inform ~~informing~~ the contact LNS of the availability of the LAC for participating in load balancing includes is an Incoming Call Request (ICRQ) message.

4. (Previously Presented) The system of claim 1 wherein the response message is an Incoming Call Response (ICRP) message.

5. (Previously Presented) The system of claim 1 further including a customer premise equipment (CPE) coupled to the LAC.

6. (Currently amended) A method of load balancing, the method comprising:
using an address of a contact L2TP Network Server (LNS) to establish an L2TP tunnel between the contact L2TP Network Server (LNS) and an L2TP Access Concentrator (LAC), the LAC containing the address of the contact LNS;
sending to the contact LNS from the LAC at least a first message to request establishment of a session between the contact LNS and the LAC and to inform the contact LNS that the LAC

~~can participate in load balancing; and at an L2TP Access Concentrator (LAC), obtaining an address of a contact L2TP Network Server (LNS);~~

~~establishing a connection between the LAC and the contact LNS;~~

~~sending to the contact LNS from the LAC a message that indicates the LAC is available for participating in load balancing;~~

~~determining whether the contact LNS can handle the a-session between the contact LNS and the LAC,~~

~~wherein, if the contact LNS can handle the session between the contact LNS and the LAC, the method further comprises ~~then~~ establishing the session between the contact LNS and the LAC and the contact LNS, and~~

~~wherein, if the contact LNS cannot handle the session between the contact LNS and the LAC, the method further comprises the LAC: ~~then the LAC~~ (i) receiving from the contact LNS an address of a next available LNS, (ii) establishing a connection with the next available LNS, and then establishing a session with the next available LNS, and (iii) receiving data and forwarding the data to the next available LNS.~~

7. (Currently amended) The method of claim 6, wherein the at least a first message to request establishment of a session between the contact LNS and the LAC and to inform the contact LNS that the LAC can participate in load balancing includes ~~that indicates the LAC is available for participating in load balancing~~ is an Incoming Call Request (ICRQ) message.

8. (Previously Presented) The method of claim 7 wherein the address of the next available LNS is included in an Incoming Call Response (ICRP) message.

9. (Previously Presented) The method of claim 7 wherein the contact LNS is included in a virtual LNS.

10. (Currently amended) A method for load balancing between a contact L2TP Network Server (LNS), an L2TP Access Concentrator (LAC), and a next LNS, the method comprising:

sending to the contact LNS from the LAC at least a first message to request establishment of a session between the contact LNS and the LAC and to inform the contact LNS that the LAC can participate in load balancing;

~~sending, to the contact LNS from the LAC, a message that indicates the LAC is available for participating in load balancing;~~

at the contact LNS, determining whether the contact LNS can handle the L2TP a-session between the contact LNS and the LAC;

sending to the LAC from the contact LNS at least a second message that (i) indicates a message to the LAC indicating whether the contact LNS can handle the L2TP session between the contact LNS and the LAC, and (ii) contains an address of the next LNS if the contact LNS cannot handle the L2TP session between the contact LNS and the LAC;

wherein, if the contact LNS can handle the L2TP session between the contact LNS and the LAC, then the method further comprises establishing the L2TP session between the contact LNS and the LAC; and

wherein if the contact LNS cannot handle the L2TP session between the contact LNS and the LAC, the method further comprises then (i) obtaining the next LNS address and providing

~~the next LNS address to the LAC, and (ii)~~ establishing a connection between the next LNS and the LAC using the next LNS address, and then establishing an L2TP session between the next LNS and the LAC.

11. (Original) The method of claim 10 wherein the contact LNS is included in a virtual LNS.

12. (Original) The method of claim 11 including the further step of determining the identity of the contact LNS within the virtual LNS.

13. (Currently amended) A system for load balancing, the system comprising:
a Customer Premise Equipment (CPE);
an L2TP Access Concentrator (LAC) coupled to the CPE;
a first network coupled to the LAC;
a second network coupled to the first network;
a contact L2TP Network Server (LNS) coupled to the first network; and
a next LNS coupled to the second network, the next LNS having an Internet Protocol (IP) address,

wherein the LAC sends ~~a message to~~ the contact LNS via the first network a, ~~the~~ message informing the contact LNS of the availability of the LAC for participating in load balancing,

wherein the contact LNS determines whether the contact LNS can handle a session with the LAC,

wherein if the contact LNS determines the contact LNS can handle the session, the contact LNS establishes the session with the LAC, and

wherein if the contact LNS determines the contact LNS cannot handle the session, the contact LNS sends to the LAC a message containing the IP address of the next LNS, and the LAC establishes a session with the next LNS via the second network.

14. (Original) The system of claim 13 wherein the contact LNS includes a table and the address of the next LNS is stored in the table.

15. (Original) The system of claim 13 wherein the contact LNS is included in a virtual LNS.

16. (Currently amended) A system for load balancing, the system comprising:
means for an L2TP Access Concentrator (LAC) to obtain ~~obtaining~~ an address of a contact L2TP Network Server (LNS);
means for sending to the contact LNS from the LAC ~~an L2TP Access Concentrator (LAC)~~ a message that indicates the LAC is available for participating in load balancing;
means for receiving from the contact LNS an address of a next available LNS;
means for establishing a connection and a session with the next available LNS; and
means for receiving data and forwarding the data to the next available LNS.

17. (Currently amended) A computer readable medium for an L2TP Access Concentrator (LAC), the computer readable medium having stored therein program code executable by a processing unit of the LAC, the program code comprising:[[:]]

first program code for causing the LAC to obtain ~~obtaining~~ an address of a contact L2TP Network Server (LNS);

second program code for causing the LAC to send ~~sending~~ to the contact LNS at the address of the contact LNS ~~from an L2TP Access Concentrator (LAC)~~, a message that indicates the LAC is available for participating in load balancing;

third program code for receiving from the contact LNS an address of a next available LNS;

fourth program code for establishing a connection and a session with the next available LNS; and

fifth program code for receiving data and forwarding the data to the next available LNS.

18. (Cancelled)

19. (Currently amended) The method of claim 6, wherein the at least a first message to request establishment of a session between the contact LNS and the LAC and to inform the contact LNS that the LAC can participate ~~that indicates the LAC is available for participating in~~ load balancing comprises a Start-Control-Connection-Request (SCCRQ) message.

20. (Previously Presented) The method of claim 7, wherein the ICRQ message comprises an attribute-value pair that indicates the LAC is capable of performing load balancing.

21. (Previously Presented) The system of claim 1, wherein the contact LNS includes a list of LNSs available to provide LNS functions if the contact LNS determines the contact LNS cannot handle a session with the LAC.

22. (Currently amended) The system of claim 1, wherein each of the plurality of load balancing LNSs transmits heartbeat signals to the contact LNS so that the contact LNS can determine which LNSs availability of the LNS's of the plurality of load balancing LNSs are available to participate in load balancing.

23. (Currently amended) The method of claim 10, wherein if the contact LNS can handle ~~provide the~~ L2TP session, then after establishing the L2TP session between the contact LNS and the LAC, the method further comprising sending user data between (i) the LAC and the contact LNS, and (ii) the LAC and a customer premises equipment (CPE), and

wherein if the contact LNS cannot handle ~~provide the~~ L2TP session, then after establishing the session between the next LNS and the LAC, the method further comprising sending user data between (i) the LAC and the next LNS, and (ii) the LAC and the CPE.

24. (Currently amended) The method of claim 10, wherein the function of determining whether the contact LNS can handle the L2TP ~~provide a~~ session includes determining whether the contact LNS is overloaded.